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THE GENUS TETRAGNATHA (ARANEAE, ARGIOPIDAE) IN JAMAICA, B.W.I., AND OTHER NEIGHBORING ISLANDS

ARTHUR M. CHICKERING

Albion College, Albion, Michigan

For several years before her death in 1953 Miss Elizabeth B. Bryant, Museum of Comparative Zoology at Harvard College, had been engaged in a comprehensive study of a collection of spiders from Jamaica, B. W. I. This collection had come from several sources but it had been assembled largely through the interest of Mr. C. Bernard Lewis, Director and Curator, Science Museum, Institute of Jamaica, Kingston, Jamaica. After Miss Bryant's death this collection was placed in my possession for continued study. On my way to Panama in June, 1954, I was able to stop in Jamaica for a reconnaissance of the island preparatory to what may be a more or less extensive study of the spiders of that country.

As an extension of my study of the genus *Tetragnatha* Latreille, 1804 in Panama, I have been much interested in examining the genus in Jamaica and in comparing the species found there with the tetragnathids in several of the larger islands of that general region. This paper is a result of that study, and types of the new species named here are deposited in the Museum of Comparative Zoology.

It is again a pleasure to acknowledge my indebtedness to the following persons for their continued encouragement in the pursuit of my studies: Dr. A. S. Romer and Dr. P. J. Darlington, Jr., Director, and Curator of Insects, respectively, in the Museum of Comparative Zoology at Harvard College, and Miss Nelda E. Wright, Editor of Publications in the same institution. Without the privileges which have been extended to me

for many years in this museum the continued progress of my studies would have been much more difficult.

Genus TETRAGNATHA Latreille, 1804

The genus has been well defined by Seeley (1928) and is, in general, well understood by araneologists. There are, however, certain characteristics of the genus which have in the past made it difficult to identify the species correctly and numerous errors must eventually be eliminated. It is also my opinion that sufficient attention has not usually been given to the question of variation within species in respect to several of the most important structural features used by taxonomists for identification. F. P. Cambridge (1897-1905) emphasized the value of the characteristics of the male palp such as the form of the paracymbium, shape and course of the conductor and embolus as well as the features of the eyes, chelicerae, and legs. Petrunkevitch (1930) and Wiegle (1939) were the first to appreciate the value of the genital area, which lacks an epigynum, in identifying females which are often exceedingly difficult to place with certainty. Color has been shown to be extremely variable and nearly worthless as a means of identification. Cheliceral teeth are often quite variable in number, degree of development, and relative position. Size, when mature, is also subject to great variation in several species. I have tried to take account of all of these salient features in making my determinations.

THE GENUS IN JAMAICA

Only the bibliographical references considered essential are given in this paper. Extensive bibliographies may be found in several sources.

TETRAGNATHA ANTILLANA Simon, 1897

T. antillana Petrunkevitch, 1930

T. antillana Bryant, 1940

T. antillana Bryant, 1942

T. festina Bryant, 1945 (male only)

T. haitiensis Bryant, 1945

This species appears to be common in Jamaica. It was found abundant at Mavis Bank over water by R. P. Bengry. Collection records: One male from the Blue Mts., southwest side of Main Range, between 3000-4000 ft. elevation, August, 1934 (P. J. Darlington, Jr.) ; both sexes from Mavis Bank, over water, March, 1953 (R. P. Bengry) ; one female from Rio Cobre, June, 1954.

TETRAGNATHA CAUDATA EMERTON, 1884

Eucta caudata Petrunkevitch, 1911

T. caudata Seeley, 1928

T. caudata Bryant, 1940

Miss Bryant had a single female from Cuba. The species appears but once in the collection from Jamaica placed at my disposal; Papine, five miles north of Kingston, April, 1937.

TETRAGNATHA EXIGUA SP. NOV.

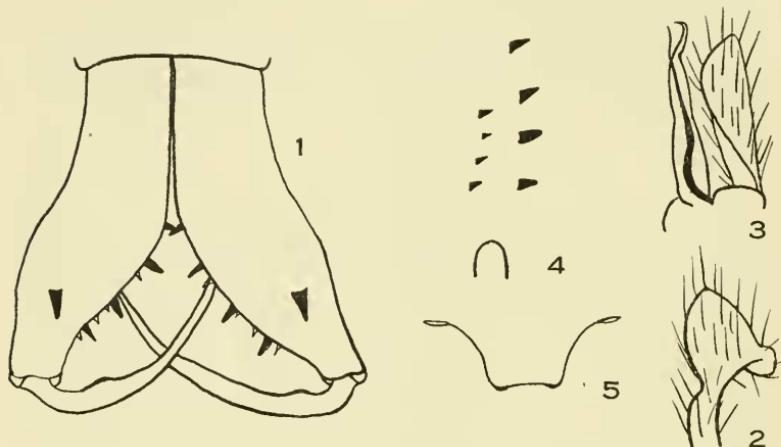
(Figures 1-5)

Male holotype. Total length including chelicerae 2.795 mm., without chelicerae 2.34 mm. Carapace 1.04 mm. long; .67 mm. wide opposite second coxae where it is widest; with the usual general form of the genus; .209 mm. tall at about the middle; nearly level from PE to posterior declivity; median depression very shallow, opposite interval between second and third coxae.

Eyes. Eight in two rows as usual; lateral ocular tubercles rather prominent; viewed from above, both rows moderately recurved; viewed from in front, anterior row slightly recurved and posterior row slightly procurved, both measured by centers; central ocular quadrangle wider behind than in front in ratio of about 4 : 3, wider behind than long in about the same ratio. Ratio of eyes AME : ALE : PME : PLE = 5.5 : 4 : 5 : 4. AME separated from one another by about 1.2 times their diameter, from ALE by about the same distance. PME separated from one another by a little less than twice their diameter, from PLE by about two thirds as far. Laterals separated from one another by about 1.25 times their diameter. AME separated from PME by a little more than the diameter of AME, hence further from one another than laterals are from one another in ratio of about 6 : 5. Height of clypeus equal to nearly 1.5 times the diameter of AME.

Chelicerae. Well developed, moderately porrect, quite divergent in distal two thirds, somewhat swollen in middle; prolateral spur a simple spine not bifid distally; fang slender, slightly sinuate, with a blunt tubercle on inner margin about one-fifth of its length from base; promargin of fang groove with four teeth, retromargin with four smaller teeth; with no "large tooth" on the promargin (Fig. 1).

Maxillae. Nearly parallel; slightly concave in middle of lateral border; somewhat more than twice as long as lip; three times as long as wide in middle.



External Anatomy of *Tetragnatha exigua* sp. nov.

Fig. 1. Chelicerae of male from in front.

Fig. 2. Paracymbium of male palp.

Fig. 3. Distal end of cymbium, conductor, and embolus.

Fig. 4. Cheliceral teeth of female.

Fig. 5. Genital fold of female.

Lip. Much widened in basal third where it is wider than long in ratio of 22 : 14; sternal suture only slightly procurved; with the usual sternal tubercles well developed at ends of sternal suture.

Sternum. Quite convex; surface finely pitted and granulated; with the usual form; continued laterally and posteriorly between all coxae; only a little longer than wide; posterior coxae sepa-

rated by a little more than their width.

Legs. 1243. Width of first patella at "knee" .1083 mm., tibial index of first leg 4. Width of fourth patella at "knee" .0758 mm., tibial index of fourth leg 5.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
(All measurements in millimeters)						
1.	2.275	.390	2.275	1.755	.718	7.413
2.	1.625	.325	1.430	1.380	.580	5.340
3.	.910	.198	.445	.550	.308	2.411
4.	1.430	.260	1.170	1.235	.455	4.550
Palp	.440	.120	.176	—	.396	1.132

Spines. True spines appear to be entirely lacking in this species (a very unusual feature); hair and bristles are sparsely present. Trichobothria are present but have not been accurately observed.

Palp. Both tibia and patella are short with tibia longer than patella in ratio of about 3 : 2. The paraecymbium is unusually broad. The conductor and embolus are shaped and related essentially as shown in Figures 2 and 3.

Abdomen. Slender; broadest near base and gradually tapered to a blunt point posteriorly; bluntly truncated at base which is not notched; 1.495 mm. long; longer than wide in ratio of about 23 : 9; not continued posterior to spinnerets. Other features as usual in the genus.

Color in alcohol. First and second femora yellowish; all other segments of legs a dusky yellowish. Palps light yellowish except the reddish brown tarsi. Chelicerae: basal segment a deep reddish brown; fang yellowish. Lip a deep reddish brown, lighter along distal border. Maxillae yellowish in medial third and brown elsewhere. Carapace a deep reddish brown, darker along the margins; median region with a narrow dark stripe posteriorly and widening at the median depression and extending to PLE; all eyes except AME surrounded by black pigment. Sternum: a deep reddish brown. Abdomen: nearly white dorsally with a few silvery spangles; in the posterior third there are very poorly outlined median gray spots with a series of very narrow black transverse lines; a fairly broad gray stripe extends along

each lateral side; the venter is generally white with a little gray around the genital area and spinnerets.

Female allotype. Total length including nearly vertical chelicerae 3.12 mm. Carapace 1.28 mm. long; .715 mm. wide opposite second coxae where it is widest; otherwise essentially as in male.

Eyes. Central ocular quadrangle wider behind than in front in ratio of 5 : 4, wider behind than long in ratio of 5 : 4. Ratio of eyes AME : ALE : PME : PLE = 6 : 4.5 : 5.5 : 5. AME separated from one another by five-sixths of their diameter, from ALE by 1.5 times their diameter. PME separated from one another by slightly more than 1.6 times their diameter, from PLE by the same distance. Laterals separated from one another by the diameter of PLE. AME separated from PME by the diameter of PLE, hence as far from one another as the laterals are from one another. Height of clypeus equal to about two-thirds of the diameter of AME.

Chelicerae. Moderately well developed; nearly vertical and parallel; basal segment .454 mm. long and, therefore, about one-third as long as cephalothorax; fang slender and evenly curved; promargin of fang groove with four well-developed teeth fairly evenly spaced; retromargin with four smaller and fairly evenly spaced teeth (delicacy of the specimen makes it difficult to observe teeth accurately).

Maxillae, Lip, and Sternum. Essentially as in male.

Legs. 1243. Width of first patella at "knee" .119 mm., tibial index of first leg 5. Width of fourth patella at "knee" .097 mm., tibial index of fourth leg 7.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
(All measurements in millimeters)						
1.	2.210	.378	2.015	2.015	.716	7.334
2.	1.625	.330	1.170	1.430	.585	5.140
3.	.845	.200	.520	.550	.396	2.511
4.	1.495	.265	1.105	1.170	.401	4.436

Spines, hairs, and trichobothria essentially as in male.

Abdomen. 1.95 mm. long; broadest near middle where it is .910 mm. wide; slightly notched at base; genital area essentially as shown in Figure 5. Otherwise essentially as in male.

Color in alcohol. Abdomen: dorsally the cardiac area is nearly colorless; there are numerous silvery spangles and a vaguely outlined folium; the venter has a central slightly grayish stripe with a stripe on each side outlined by silvery spangles. Otherwise essentially as in male.

Type locality. Holotype male, allotype female, and three paratype males from Hanover, Askenish, Trail to Dolphin Head, Jamaica, June 24, 1954.

TETRAGNATHA PALLESCENS F. P. Cambridge, 1903

Eugnatha pallescens Petrunkevitch, 1911

T. pallescens Petrunkevitch, 1930

T. pallescens Bryant, 1940

T. pallescens Bryant, 1945

Collection records: A male and a female from Ocho Rios, January 1929 (W. S. Brooks); several of both sexes from St. Catherine, Port Henderson, Salina, November, 1949 (Bengry, Lewis, Wiles); both sexes from St. Thomas, Lyssson, June, 1954.

TETRAGNATHA TENUISSIMA O. P. Cambridge, 1889

T. tenuissima Petrunkevitch, 1930

T. tenuissima Bryant, 1940

T. tenuissima Bryant, 1945

Only one specimen, a male, has appeared in the collection available to me; St. Elizabeth, Magotty, May, 1953 (G. R. Proctor).

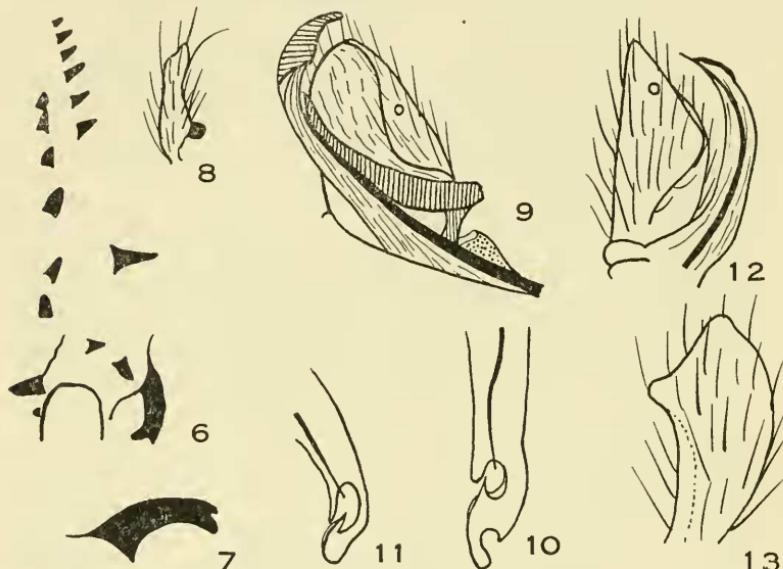
TETRAGNATHA VISENDA sp. nov.

(Figures 6-9)

Male holotype. Total length including chelicerae 8.58 mm.; without chelicerae total length 7.475 mm. Carapace 2.60 mm. long; 1.495 mm. wide opposite second coxae where it is widest; with the usual general form of the genus; .66 mm. tall opposite third coxae just anterior to posterior declivity.

Eyes. Eight in two rows as usual; lateral ocular tubercles only moderately prominent; viewed from above, posterior row moderately recurved, anterior row strongly recurved; viewed from

in front, anterior row moderately recurved, posterior row slightly procurved, all measured by centers; central ocular quadrangle wider behind than in front in ratio of 6 : 5, wider behind than long in ratio of 9 : 8. Ratio of eyes AME : ALE : PME : PLE = 11 : 5.5 : 8 : 7.5. AME separated from one another by slightly more than their diameter, from ALE by



External Anatomy of *Tetragnatha*

Fig. 6. *T. visenda* sp. nov.; cheliceral teeth of male from below.

Fig. 7. *Idem*; the prolateral spur of male.

Fig. 8. *Idem*; the male paracymbium.

Fig. 9. *Idem*; distal end of male tarsus.

Figs. 10-11. *T. versicolor* Walck.; distal ends of conductors and emboli from Cuba and Michigan, respectively.

Figs. 12-13. *T. parva* Bryant; distal end of male tarsus and paracymbium, respectively.

nearly twice their diameter. PME separated from one another by 2.5 times their diameter, from PLE by slightly more than this. Laterals separated from one another by slightly more than the diameter of PLE. AME separated from PME by slightly

more than the diameter of AME, thus are farther from one another than laterals are from one another in ratio of about 12 : 7.5. Height of clypeus equal to a little more than two-thirds the diameter of AME.

Chelicerae. Well developed; moderately porrect; quite divergent in distal two-thirds of basal segment; somewhat swollen in distal half; prolateral spur well developed and clearly bifid with the larger lobe directed inward (Fig. 6); the fang is long, slender, only slightly sinuate; the fang groove has the so-called "large tooth" with eight others on the promargin and eight on the retromargin (Fig. 6).

Maxillae. Slender; considerably divergent in distal halves; a little more than twice as long as lip; longer than wide in middle in ratio of 4 : 1.

Lip. Only slightly wider at base than long; sternal suture clearly procurved; with the usual sternal tubercles well developed at ends of sternal suture.

Sternum. Only slightly convex; somewhat swollen opposite second coxae; with the usual general form; longer than wide in ratio of 12 : 7; continued laterally and posteriorly between all coxae; posterior coxae separated by about one-fourth their width.

Legs. 1243. Width of first patella at "knee" .395 mm., tibial index of first leg 5. Width of fourth patella at "knee" .260 mm., tibial index of fourth leg 6.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
(All measurements in millimeters)						
1.	6.500	1.105	6.890	7.475	1.560	23.530
2.	4.680	.910	4.225	4.420	.975	15.210
3.	2.340	.550	1.397	1.755	.600	6.642
4.	4.940	.715	3.835	4.420	.845	14.755
Palp	1.560	.370	.520	—	.850	3.300

Spines. All legs with spines of moderate size and length; a sparse coating of hair is also present. Trichobothria are present on femora and probably other segments of legs but their position has not been accurately observed.

Palp. Tibia and patella both short with tibia longer than patella in ratio of about 3 : 2. The paracymbium is rather long

and slender with the chitinous knob about one-third of length of the structure from base (Fig. 8). The conductor terminates in a characteristic manner best shown in Figure 9.

Abdomen. Slender; only slightly concave at base; widest near middle; 5.07 mm. long and about 1.43 mm. wide in broadest region; not continued posterior to spinnerets; other features as usual in the genus.

Color in alcohol. All legs light yellowish brown, lighter below; first and second somewhat dusky dorsally and dorsolaterally with occasional grayish patches; third and fourth mostly lacking the dusky coloring and grayish patches. Chelicerae reddish brown, grayish along lateral surfaces. Lip dark brown with yellowish distal border. Maxillae yellowish in medial halves, darker along lateral halves. Carapace reddish brown with darker radiating streaks and an irregular granular border. Sternum reddish brown with darker irregularly grouped fine dots. Abdomen: dorsum light yellowish because of presence of numerous irregular subchitinous yellowish white deposits making this region very granular in appearance; there are also many short irregular grayish lines which become more longitudinal in position and prominent along the lateral sides; the venter has a median grayish stripe with a broader granular yellowish stripe on each side together with a white spot just lateral to each anterior spinneret and a smaller white spot just dorsal to the larger one.

Type locality. The male holotype was taken at St. Catherine, Port Henderson, June 20, 1954. One male paratype is in the collection from a house in St. Andrew, August, 1955 (G. R. Proctor).

THE GENUS IN CUBA

TETRAGNATHA ANTILLANA Simon, 1897

There is but one specimen, a male, in the collection in the Museum of Comparative Zoology but the species has been recorded from several localities.

TETRAGNATHA CAUDATA Emerton, 1884

Two females are in the collection in the Museum of Comparative Zoology, both taken at different times in Soledad gardens.

TETRAGNATHA ELONGATA Walckenaer, 1805

This species is well represented by both sexes in the collection and appears to be the most common of all of the eight species recorded from the island.

TETRAGNATHA GUATEMALENSIS O. P. Cambridge, 1889

T. banksi McCook, 1893

T. seneca Seeley, 1928

T. banksi Levi and Field, 1954

Drs. Gertsek and Levi have apparently agreed that *T. seneca* Seeley is the same as *T. banksi* McCook. I have made careful comparisons of the specimens from Cuba identified as *T. seneca* Seeley with my numerous specimens of *T. guatemalensis* O. P. Cambridge from Panama and other parts of Central America with the result that I am convinced that here we have another case of synonymy. The characteristics of eyes, several features of the male palps such as vermiciform distal end of the paraeymbium and course and shape of both conductor and embolus together with the general characters of the chelicerae all point toward this conclusion. Some may object that I am taking too much liberty with the cheliceral teeth because the "large tooth" is absent in *T. seneca* Seeley. This "large tooth" is not well developed in *T. guatemalensis* O. P. Cambridge and could very well have been reduced to the condition found in *T. seneca* Seeley. The specimens in the Museum of Comparative Zoology identified as *T. banksi* McCook also agree well with *T. seneca* Seeley as concluded by Levi and Field (1954).

TETRAGNATHA ORIZABA Banks, 1898

There are several specimens of both sexes from several localities in Cuba. Also recorded from Hispaniola but from no other place in the West Indies so far as known to the author of this paper.

TETRAGNATHA PALLESCENS F. P. Cambridge, 1903

Both sexes are represented in the collection from Havana and Soledad.

TETRAGNATHA TENUISSIMA O. P. Cambridge, 1889

Both sexes have been recorded from several localities.

TETRAGNATHIA VERSICOLOR Walckenaer, 1841*T. extensa* Emerton, 1884*T. dentigera* F. P. Cambridge, 1903*T. extensa* Seeley, 1928

The specimens from Soledad identified as *T. dentigera* F. P. Cambridge are, I believe, correctly recognized. These are especially interesting because of the fact that I have been forced to the conclusion that *T. dentigera* F. P. Cambridge is a synonym for *T. versicolor* Walek. I have examined a large number of specimens assigned to the latter species and as many as possible of the former. The cheliceral teeth, several features of the male palps (paracymbium, conductor, embolus) and the eyes all point rather decisively toward the synonymy which I have indicated. The tip of the conductor is like nothing else in the genus so far as I have seen. I have provided a drawing of the tip of the conductor from a specimen collected in Cuba and another from a specimen of *T. versicolor* taken in Michigan. There are slight differences but the basic plan is the same and the differences are well within the normal variation of a species (Figs. 10, 11).

THE GENUS IN HISPANIOLA**TETRAGNATHA ANTILLANA Simon, 1897***T. festina* Bryant, 1945 (male only)*T. haitiensis* Bryant, 1945 (females)

The males of *T. festina* Bryant have the bifid paracymbium, other features of the male palpi, eyes, and general cheliceral characters associated with *T. antillana* Simon. *T. haitiensis* Bryant has the general form, cheliceral characters, and genital area characteristic of females of *T. antillana*. The small differences noted by Miss Bryant and myself are all, I believe, within the normal variation for a species ranging over a wide area.

TETRAGNATHA CONFRATERNA Banks, 1909*T. elongata* Bryant, 1945

One female from Puerta Plata, Dominican Republic, was identified as *T. elongata* Walek., 1805. I have examined this specimen very carefully and I am convinced that it has been

misidentified. Its slightly extended abdomen, cheliceral characters, eyes, and genital area seem to place it in the species *T. confraterna* Banks where it is provisionally left.

TETRAGNATHA ORIZABA Banks, 1898

T. orizaba Bryant, 1945

The specimens of both sexes from the Dominican Republic seem to agree well with our current understanding of this species.

TETRAGNATHA PALLESCENS F. P. Cambridge, 1903

T. pallescens Bryant, 1945

Numerous specimens of both sexes from Haiti seem to indicate that this may be the most common species in Hispaniola.

TETRAGNATHA TENUISSIMA O. P. Cambridge, 1889

T. tenuissima Bryant, 1945

T. festina Bryant, 1945 (females only)

The cheliceral teeth, eyes, general form, lack of leg spines, and the genital area all indicate that *T. festina* females belong with *T. tenuissima* O. P. Cambridge.

THE GENUS IN PORTO RICO

I have had very little opportunity to study the species of *Tetragnatha* from Porto Rico. Petrunkevitch (1930) listed the following species from this island: *T. antillana* Simon; *T. elyunquensis* Petrunkevitch; *T. laboriosa* Hentz; *T. pallescens* F. P. Cambridge; *T. piscatoria* Simon; *T. subextensa* Petrunkevitch; *T. tenuissima* O. P. Cambridge; *T. vicina* Simon. There appears to be considerable doubt about the occurrence of *T. vicina* in Porto Rico. In 1947 Miss Bryant described *T. parva* from the Luquillo Mountains thus bringing the total number of recorded species in this island to nine. Two figures of the tip of the conductor and closely related structures have been prepared to supplement those provided by the author of the species (Figs. 12, 13).

THE GENUS IN THE VIRGIN ISLANDS

Very little opportunity has been afforded me to study the spiders of these small islands. I have carefully examined all specimens, however, now in the collection of the Museum of Comparative Zoology and am prepared to summarize my findings as follows: The vial labelled *T. antillana* Simon contains specimens belonging to this species but it also contains two females which I am tentatively assigning to *T. confraterna* Banks. The same vial contains a male palp which I believe was derived from this same species. Perhaps we may at least tentatively regard this species as being in the West Indies. The single male assigned to *T. piscatoria* Simon is, in my judgment, not this species but a specimen belonging to *T. visenda* sp. nov.

GENERAL SUMMARY

At the present time it seems that either fifteen or sixteen species of *Tetragnatha* may be considered to be known from the West Indies under consideration here. *T. elyunquensis* Petrunkevitch, *T. exigua* sp. nov., *T. parva* Bryant, *T. subextensa* Petrunkevitch, and *T. visenda* sp. nov. are known only from the islands from which they were described. *T. antillana* Simon has been recorded from all islands mentioned here. *T. caudata* Emerton has been recorded from Cuba and Jamaica. *T. confraterna* Banks is probably to be regarded as present in both Hispaniola and the Virgin Islands. *T. elongata* Walek. is only certainly known from Cuba. *T. guatemalensis* O. P. Cambridge is now known only from Cuba. *T. laboriosa* Hentz is, apparently, present only in Porto Rico. *T. orizaba* Banks appears to be in Cuba and Hispaniola. *T. pallescens* F. P. Cambridge has been recorded from all islands considered here except the Virgin Islands. *T. piscatoria* Simon is known only from Porto Rico among the islands considered here but it was described from St. Vincent. *T. tenuissima* O. P. Cambridge is known from all of these islands except the Virgin Islands. *T. vicina* Simon has been recorded from Porto Rico but its presence there appears doubtful.

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